BECHTEL REPORT ISSUES AS DISCUSSED IN PRIOR QUARTERLY REPORTS AND TESTIMONY AND IN CORRESPONDENCE FROM AND WITH ORS

1. PROBLEMS WITH CONSORTIUM

Bechtel Executive Summary: Issues Facing the Project, p. 1

- The Consortium lacks the project management integration needed for a successful project outcome.
- There is a lack of a shared vision, goals, and accountability between the Owners and the Consortium.
- The Contract does not appear to be serving the Owners or the Consortium particularly well.
- The relationship between the Consortium partners (Westinghouse Electric Company (WEC) and Chicago Bridge & Iron (CB&I)) is strained, caused to a large extent by commercial issues.

Pre-Bechtel Report

Pre-filed Direct Testimony of Stephen A. Byrne, May 26, 2015, 2015-103-E, Transcript at 253-254.

"It is a critical necessity for the project that we effectively enforce the EPC Contract for the benefit of the customers of SCE&G and Santee Cooper. But effectively managing a project of this scope and complexity also requires a close working relationship between the owners and the contractor. This leads to an important challenge, that of maintaining an effective working relationship with WEC/CB&I in spite of mounting commercial disputes over the rights of the parties under the EPC Contract. Striking the proper balance between these two potentially conflicting requirements is a challenge now and will be an increasing challenge going forward. Failure in either direction could be a risk to the project. This effort is complicated by the high level of turnover in WEC/CB&I project management. The senior on-site project managers have resigned, or have been replaced several times since the project began. This turnover has made establishing and maintaining effective working relationships a challenge."

Testimony of Kevin B. Marsh, July 21, 2015, 2015-103-E, Transcript at 141-43.

(Cross examination by Robert Guild)

"We have been in discussions with the consortium on numerous occasions since we got the revised integrated schedule. I believe it was in August of last year, and the cost data that went with that schedule followed shortly thereafter. Once we got the cost information, we put a

team together on the site, at the project, to review the schedule, to understand the assumptions they'd made, and to challenge the costs and the data that was in that schedule to determine, one, if we thought it was a reasonable estimate to reflect what it would take to complete the plants, based on the timeline they had given us. Our team on site agreed with the costs as the best estimate we had at the time and what it would take to complete the plants by June of '19—Unit 2 in June of '19 and Unit 3 in June of 2020. And based on that, we then began to negotiate over who would be responsible for the costs. So we didn't have a dispute over what the costs were and whether or not they were reasonable; it was a question of accountability or who would be actually the one to pay the costs."

…

We have talked with the consortium about our disagreement with those costs, and the reasons giving rise to those costs, principally—the delay in the structural submodules that have been delivered to us, and some productivity factors based on the work that's being performed at the plant—and do not believe that we are responsible for paying these costs. We have identified those cost to them. We have, you know, not gone to a legal proceeding at this point, but, certainly, that's an option we will have at some point down the road if we can't find a fair resolution."

Testimony of Kevin B. Marsh, July 21, 2015, 2015-103-E, Transcript at 146-148.

(Cross examination by Robert Guild)

"The consortium—I need to be honest with the Commission—they have a position that's very different from ours, which is why we're in negotiations….Certainly, we've identified in our testimony that we don't think the consortium is in compliance with the contract, specifically in the areas of the submodules that are delivered to the plant site, to comprise the modules that are put together there, and in their productivity on the site."

September 30, 2015 Quarterly Report at 15.

"During the period, SCE&G learned that work to incorporate certain design changes to submodules being constructed at CB&I-LC had been delayed due to a commercial dispute between CB&I and WEC concerning responsibility for the cost of the changes."

Letter from Dukes Scott to SCE&G, October 14, 2015

"On September 10, 2015, ORS consultant, Gary Jones, visited Greenberry and Vigor (previously Oregon Iron Works) module-fabrication facilities located near Portland, Oregon. Below are ORS observations and recommendations resulting from Mr. Jones' visit; SCE&G needs to:

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- Continue to pursue the release of design-change documentation to the fabricators. Changes have been held by CB&I and not released to the fabricators because of contract cost-dispute issues between Westinghouse and CB&I."

Post-Bechtel Report

Pre-filed Direct Testimony of Kevin B. Marsh, July 1, 2016, 2016-223-E, Transcript at 55-56.

"After the July 2015 BLRA update hearing, we continued our efforts to negotiate a resolution with the Consortium. At that time, it became increasingly apparent that disagreements between Westinghouse and CB&I were impeding our attempts to negotiate a settlement with them jointly. In our discussions, we sensed a distinct lack of cooperation and agreement between the Consortium partners. It became obvious to us that there were commercial disputes between those two companies that were causing relationships to deteriorate. But because the Consortium documents are confidential to us, we did not have a window into those disputes. However, it was clear that the Consortium was not unified in addressing the challenges facing the project.

Outside of our direct negotiations with the Consortium, it became clear that the Consortium partners were in dispute about key matters, such as who was responsible to pay for the schedule mitigation plans of certain subcontractors and who would pay the subcontractors' costs for making late-in-the-process design changes in certain components and submodules. These disputes were threatening efforts to maintain and improve the project schedule.

During the first week of September 2015, Westinghouse and CB&I requested a meeting with us and Santee Cooper. At the meeting, CB&I communicated to us its desire to exit the project and refocus its business on other areas. Under its new direction, CB&I would continue to offer nuclear maintenance and refueling services to the industry, but they no longer wanted to be in the nuclear-power-plant construction business. CB&I further stated its belief that the negotiations between the Consortium, SCE&G and Santee Cooper had stalled and we were headed toward litigation over the costs that SCE&G and Santee Cooper were disputing. The Consortium representatives told us that the litigation related to the two AP1000 units SNC is constructing at the Vogtle site in Georgia had been very expensive, time-consuming, and distracting to the orderly progress of the project. CB&I expressed its belief that it would be in the best interest of all parties if CB&I were to exit the project and a different path forward could be found.

At that juncture, Westinghouse and CB&I told us that they had tentatively resolved their internal disputes through an agreement which would allow CB&I to exit the Consortium."

This same testimony is also provided in the summary of Kevin Marsh's testimony at 37 and at pages 109-110.

Testimony of Kevin B. Marsh, October 4, 2016, 2016-223-E, Transcript at 107.

"I believe the issues we talked about in the July hearing and also when we came back in the *ex parte* in November had to do with our relationship with Westinghouse and CB&I. We had indicated in the July hearing that there were a number of issues that were in dispute that we

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continued to try to resolve with the consortium in a favorable manner for customers. We felt like the amendment to the EPC contract that was signed with Westinghouse in October gave us a chance to resolve those issues, and our effort in November was to update the Commission as quickly as possible as to what had happened, because they showed a keen interest and encouraged us to work extremely hard to resolve those issues at the hearing in July. So that's what we were discussing with the Commission in November."

Pre-filed Direct Testimony of Stephen A. Byrne, July 1, 2016, 2016-223-E, Transcript at 421-422.

"… Internal Consortium agreements and interactions are confidential as to us. However, by mid-2015, disputes were spilling over into the supply chain and impeding action on important issues. The disputes seemed to be about who in the Consortium was responsible for paying for unanticipated costs in Fixed or Firm cost categories. Important matters were being delayed while the Consortium partners worked out their differences.

At the same time, the Consortium would not engage SCE&G and Santee Cooper in meaningful negotiations about the outstanding disputes we had with them. It seemed to us that CB&I and Westinghouse were avoiding negotiating with us rather than presenting us with a divided front.

We also understood that Consortium members were coming under financial stress because of the large payments SCE&G had begun to withhold in 2015. SCE&G did so to protect its rights under the EPC Contract and to put pressure on the Consortium to improve its schedule and efficiency performance. The Consortium disputed our right to withhold these payments. But in the end, we withheld payments worth over $135 million on a 100% basis. It was not clear what the Consortium would do in response. But we considered litigation to be a likely result.

When we met in September of 2015, CB&I stated that in its opinion the project was headed toward litigation, certainly between the Consortium and Santee Cooper and SCE&G, and possibly between members of the Consortium itself. Going to litigation could have been highly damaging to the project."

Testimony of Stephen A. Byrne, October 12, 2016, 2016-223-E, Transcript at 392.

"From the project-management perspective, the amendment came at an opportune time. Prior to the amendment, CB&I was experiencing problems as the construction lead in improving labor productivity and meeting schedule goals. SCE&G had been using what it believed to be its rights under the EPC contract to put financial pressure on Westinghouse and CB&I to correct inefficiencies. Disputes between SCE&G and the consortium of Westinghouse and CB&I were escalating and moving towards litigation. Litigation would have been expensive and disruptive, and, worse, it would've made it difficult to agree on schedule mitigation plans and for the parties to communicate openly and cooperate freely in managing the project.

The amendment took us off that course. Westinghouse is now the sole entity responsible for all decisions and all costs under the EPC contract. This change will streamline decision-making, reduce inefficiencies, and allow any disputes to be addressed more quickly. The

amendment also cleared the way for Westinghouse to bring the Fluor Corporation into the project…."

Testimony of Stephen A. Byrne, October 12, 2016, 2016-223-E, Transcript at 503-504.

(Cross examination by Sandra Wright)

"A: When CB&I came on the project, we thought that they would be an improvement over the Shaw Group, and we were optimistic based on the performance of the CB&I Services group on the site with the shield building contraction, that we would see an improvement in worker efficiencies and those kind of things. That did not materialize.

Q: When did you realize that wasn't materializing?

A: Exactly when, I don't know. But we gave them some opportunities over a year, or so, to come up with improvements. Those improvements weren't happening, and then we starting challenging them on those and started withholding money."

Testimony of Stephen A. Byrne, October 12, 2016, 2016-223-E, Transcript at 528-529.

(Cross examination by Sandra Wright)

"A: [Westinghouse] had a myriad of problems and issues. One of the biggest problems and issues is that the consortium partners were not getting along. You know, we saw some of that. We certainly didn't see all of it. Obviously, as a consortium, they had a consortium agreement that we were not privy to, so they had commercial disputes between the two companies. They resolved those as they have exited. So Westinghouse won't have the excuse that they can point at CB&I any longer, and CB&I would, at times, point at Westinghouse, so they were pointing fingers at each other. That issue has gone away because it's now Westinghouse's responsibility."

Testimony of Stephen A. Byrne, October 12, 2016, 2016-223-E, Transcript at 572.

(Cross examination by Robert Guild)

"Q: So, Chicago Bridge & Iron, as we've been told and as you've told us, was largely responsible for much of the productivity shortfalls, quality shortfalls, that got us where we are today in terms of additional costs and delaying the project; isn't that the case?

A: CB&I was, yes.

…

Q: And CB&I, therefore, incurred liability to SCANA/SCE&G for those contractual failures to meet schedule, to meet productivity requirements, and to produce product that met quality standards; isn't that the case?

A: Certainly, that was a contentious point between us."

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Pre-filed Testimony of Gary Jones, ORS, September 1, 2016, 2016-223-E, Transcript at 905.

"This contractual ownership change is a positive step forward in completing the Project. The commercial relationship between WEC and CB&I had deteriorated to the point that it was jeopardizing the completion of the Units. I view CB&I's exit as a necessary change."

June 30, 2016 Quarterly Report at 12.

"Commercial issues between WEC and CB&I related to mechanical modules produced by CB&I-LC remain partially unresolved and are impacting mechanical module production schedule. WEC has undertaken schedule mitigation planning related to this issue. Potential critical-path mechanical modules that had been assigned to CB&I-LC are being shipped to the site in kit form and are being fabricated there. Production of these modules, and other structural and mechanical modules, remains an important focus area for the project."

2. PRODUCTIVITY

Bechtel Conclusions: Issues to be Resolved, p. 61-62

- Construction productivity is poor for various reasons including changes needed to the design, sustained overtime, complicated work packages, aging workforce, etc.
- The indirect to direct craft ratio is high.
- Field non-manual turnover is high.

Pre-Bechtel Report

Pre-filed Direct Testimony of Stephen A. Byrne, May 26, 2015, 2015-103-E, Transcript at 277.

"At present, SCE&G is challenging several categories of costs being billed to it by WEC/CB&I. Those challenges include:

…

3. Cost invoiced by WEC/CB&I which are the result of WEC/CB&I not meeting productivity factors. SCE&G believes that WEC/CB&I is under a contractual obligation to efficiently conduct its construction activities, and some or all of any labor costs based on failure to meet productivity factors is WEC/CB&I's payment responsibility."

Pre-filed Direct Testimony of Carlette L. Walker, May 26, 2015, 2015-103-E, Transcript at 616-617.

"[T]he cost increases in these categories are primarily attributable to the delay caused by the inability of the module fabrication facility in Lake Charles, Louisiana, to produce submodules for the project in a timely fashion. WEC/CB&I also has not met the overall productivity factors on which its original cost estimates were based and has increased its labor productivity factors resulting in increased Direct Craft Labor cost for the project. Design changes by WEC also have increased the anticipated number of LARS [License Amendment Requests] required during the construction process, and WEC projects that additional licensing support will be necessary to process these LARs. Finally, WEC has proposed to increase the ratio of Indirect Craft Labor to Direct Craft Labor and the ratio of Field Non-manual Labor to Direct Craft Labor. SCE&G asserts that WEC/CB&I is contractually responsible for these issues and the resulting increases in the Delay and Other EAC cost."

PRODUCTIVITY

Pre-filed Direct Testimony of Stephen A. Byrne, May 26, 2015, 2015-103-E, at Transcript 256-258.

"For various reasons, to date WEC/CB&I has not met the overall PF on which its original cost estimates were based. In preparing the Revised, Fully-Integrated Construction Schedule, WEC/CB&I forecasted an increase its PF across the board. (The higher the rate indicates more hours required for a task). SCE&G has not accepted responsibility to pay for this increased labor. Unfavorable productivity factors have been a matter of frank and direct discussion between the parties, and WEC/CB&I's senior leadership has recognized the need to improve in this area. In justifying their confidence in the revised rate on which the current construction schedule is based, WEC/CB&I points to things like reduced delay in submodule production, increasing levels of design finalization, and lessons learned from construction of the first AP1000 unit in China. They also point to the increasing adaptation by the project's work-force to the requirements of nuclear construction. They further reference the assumption that productivity for Unit 3 will improve due to the experience gained in completing similar scopes of work on Unit 2.

SCE&G fully supports WEC/CB&I in its efforts to improve labor productivity and will continue to monitor WEC/CB&I's performance and demand improvement. But the possibility that WEC/CB&I will fail to meet current productivity assumptions for the project represents an important risk to both the cost forecasts and the construction schedule for the project."

Direct Testimony of Stephen A. Byrne, July 21, 2015, 2015-103-E, at Transcript 217.

"It is taking the consortium too much time and too much labor expense for the scopes of work required to complete the project. For the current schedules to be achieved, the consortium must improve the productivity factors of their workforce. Unfavorable productivity factors have been the matter of frank discussions between the parties, and the consortium's senior leadership recognizes the need to improve in this area."

Pre-filed Direct Testimony of Kevin B. Marsh, May 26, 2015, 2015-103-E, Transcript at 88-90 (quoting Combined Application, Docket No. 2008-196-E, Exhibit J, p. 6-12)

"SCE&G's 2008 BLRA application acknowledged that, "[f]or a project of the scope and complexity of the licensing and constructing of the Units, any list of potential risk factors compiled at this stage of the process will not be exhaustive." Petition, Docket No. 2008-196-E, Exhibit J, p. 12. With that caveat, SCE&G listed the specific risks that seemed most important at the time. Among the risks specifically enumerated at that time were many, if not all, of the risks that have resulted in the current update filing: …

- Construction Efficiencies: "The project schedule and costs are based on efficiencies and economies anticipated from the use of [standardized designed and advanced modular construction processes]. . . . However, standardized design and advanced modular construction has not been used to build a nuclear facility in the United States to date. The construction process and schedule is subject to the risk that the

benefits from standardized design and advanced modular construction may not prove as great as anticipated."…."

March 31, 2015 Quarterly Report at 4-5.

"SCE&G sent WEC/CB&I a letter on May 5, 2015, after the close of the reporting period, outlining certain steps SCE&G intends to take to withhold payment of invoiced amounts related to delay and performance factors."

This statement was repeated in the June 30, 2015 Quarterly Report.

June 30, 2015 Quarterly Report at 2-3.

"It is SCE&G's position that the delay and the majority of the increased costs reflected in the current schedules have been due to WEC/CB&I's failure to meet its contractual obligations related to structural module fabrication, timely design finalization, labor productivity, indirect labor costs and other matters, all despite SCE&G's repeated insistence upon improvements in performance. Accordingly, SCE&G has advised WEC/CB&I that it remains contractually obligated to satisfy the Guaranteed Substantial Completion Dates previously agreed to in the EPC Contract and other obligations under the EPC Contract, and WEC/CB&I is liable for costs associated with delay and other matters."

September 30, 2015 Quarterly Report at 10.

"SCE&G continues to monitor WEC/CB&I's labor productivity. Labor productivity continues to be a major challenge for the project. WEC/CB&I is analyzing the factors impeding productivity and is reporting on its efforts to resolve this issue. This is a focus area for the project."

Letter from Dukes Scott to SCE&G, December 14, 2015

"The increased labor productivity rates necessary to attain the completion dates for the Project have not been realized, and no discernable progress has occurred. Some additional delays can be expected in the transition relating to CB&I's departure and Fluor coming up to speed; therefore, it is difficult to understand how these delays, coupled with the continued below-par productivity rates, support the Project completion dates. This issue will need to be addressed by SCE&G once the transition is completed."

December 31, 2015 Quarterly Report at 2.

"To aid in the transition, WEC and Fluor convened 25 work stream review teams which met during the period to evaluate key aspects of this project and the sister AP1000 construction project, the Southern Company's project to construct Vogtle Units 3 & 4. The goals of these 25 work stream review teams were to streamline processes, eliminate inefficiencies and identify means to increase the levels of productivity and accountability for key work processes. SCE&G personnel participated on multiple work teams as did personnel from Southern Company. As a result of these efforts, WEC and Fluor are moving to standardize and simplify work packages for

construction activity related to the nuclear islands (NIs) for the four units, streamline the processes for the transfer of equipment between suppliers and contractors, and minimize design changes being communicated to module and submodule vendors."

December 31, 2015 Quarterly Report at 3.

"Fluor is in the process of updating the construction schedule for the Units to reflect the changes due to the Settlement and its review of the work streams. The activities associated with the transition, specifically achieving the anticipated improvements in efficiency and productivity, along with meeting the new construction schedule when issued, are principal focus areas for SCE&G. Schedule mitigation will be required to meet the substantial completion dates agreed to in the Settlement."

December 31, 2015 Quarterly Report at 9.

"Labor productivity improvement continues to be an important focus area for the project. WEC and Fluor are working on a plan to increase productivity as direct responsibility for on-site construction shifts to Fluor."

Letter from Dukes Scott to SCE&G, January 5, 2016

"If the productivity and efficiency gains required to complete this project in a timely manner and within budget are to be realized, Fluor will need to leverage its vast experience in this area through utilizing specific work processes and management controls, which it can do only if it is granted direct responsibility for the craft labor."

March 31, 2016 Quarterly Report at 1.

"To mitigate the construction schedule, Fluor has implemented changes to the schedules that construction crews are working. A limited night shift of approximately 300 craft workers is in place. Fluor plans to expand to a full night shift of more than 1,000 craft workers when hiring and training make this feasible. Availability and retention of labor is the principal limiting factor for mitigating the project schedule through a more aggressive labor schedule."

March 31, 2016 Quarterly Report at 2.

"Since the Amendment was signed in the last quarter, Fluor has initiated or proposed a total of 28 Functional Area Assessments (FAAs) to improve project efficiency and schedule performance by assessing and restructuring individual work streams. These FAAs are being conducted in collaboration with WEC, SCE&G and Southern Nuclear Company (SNC). Fifteen FAAs have been initiated; seven FAAs are complete. The results of three are fully implemented. These initial FAAs have focused on safety, change management, quality control programs, commercial grade dedication, field engineering, construction programs/productivity, facilities plans, equipment plans and construction permitting. Fluor's review of the Integrated Project Schedule (IPS) continues and will incorporate changes due to the Amendment, the FAAs, and the analysis of schedule mitigation plans."

PRODUCTIVITY

Post-Bechtel Report

Letter from Dukes Scott to SCE&G, May 13, 2016

"Construction labor productivity rates and overall productivity improvements have not yet significantly increased, although the activity levels have increased. Craft labor manpower increases will need to occur soon if there is to be a chance of meeting project completion dates. Process changes in several areas such as welding, procurement, and work-package preparation and closure will also soon need to be implemented to meet completion schedules."

Letter from Dukes Scott to SCE&G, June 30, 2016

"Westinghouse and Fluor continue to struggle with craft labor productivity. While a slight improvement was shown during the first three months of Fluor's tenure on site, the most recent two months have trended negatively, with a performance factor now hovering around 2.0. This score indicates that only about half the work planned is being done for the labor hours expended. Furthermore, the project has not attained the improved productivity factor of 1.15 that formed the basis for the approved schedule and budget in Order No. 2015-661. Fluor's efforts to implement process changes through their Functional Area Assessments and subsequent improvement recommendations appear to be a step in the right direction; however, the assessments and the associated implementation of identified improvements are moving much too slowly. This effort needs to accelerate dramatically if the project is to meet its scheduled completion dates."

June 30, 2016 Quarterly Report at 2.

"Westinghouse Electric Company, LLC (Westinghouse or WEC) and Fluor continue to conduct a series of Functional Area Assessments (FAAs) defining actions to streamline processes and implement performance improvements. Changes identified in the first round of FAAs are being implemented. Fluor's integration into the project continues with the assignment of key personnel to project management functions and with changes in roles and reporting structures to increase clarity regarding the division of responsibility among leadership teams and functional areas."

June 30, 2016 Quarterly Report at 2.

"To mitigate delays in the construction schedule, Fluor continues to operate a 2-6-10 and 1-5-10 schedule, *i.e.*, construction crews are scheduled to work six ten-hour days for two weeks, then five ten-hour days for one week."

PRODUCTIVITY

Pre-filed Direct Testimony of Stephen A. Byrne, July 1, 2016, 2016-223-E, Transcript at 421-422.

"When CB&I became the Consortium's construction lead in 2013, there was good reason to expect positive results. An operating division of CB&I, CB&I Services, had been on site for several years fabricating the containment vessels for the Units. After some initial quality issues that were quickly resolved, CB&I Services' work was consistently timely and of high quality. In its role as construction lead, however, CB&I did not succeed as expected in improving construction productivity on the site or resolving quality issues and timeliness issues at submodule suppliers."

Pre-filed Direct Testimony of Kevin B. Marsh, July 1, 2016, 2016-223-E, Transcript at 53-57.

"Over the last several years, SCE&G and its partner, Santee Cooper, have put increasing pressure on the Consortium to improve construction efficiencies and correct supply chain problems particularly as related to submodule fabrication and fabrication of other components. Initially, we sought to increase pressure on the Consortium through techniques such as increased Quality Assurance and Quality Control (QA/QC) staffing and heightened levels of QA/QC inspections and audits on-site and at key suppliers' locations worldwide. SCE&G posted full-time QA/QC inspectors at the most important suppliers' off-site facilities. We conducted regular oversight meetings with the Consortium. We regularly and very emphatically escalated issues of concern to senior levels within the Consortium and followed up on those issues. We were supported in this effort by our partner, Santee Cooper, and Southern Nuclear Company ("SNC") which is constructing two AP1000 units at its Vogtle site in Georgia.

However, in the years leading up to the Amendment negotiations, we became increasingly frustrated with the results the Consortium was achieving. In July 2014, we began to withhold large payments for calendar-based EPC payments where we did not believe sufficient progress had been made to support the amount of the required payments. We also returned invoices unpaid where they reflected additional costs caused by delay or other inefficiency (like additional storage and maintenance cost for equipment stored on site).

Furthermore, under the EPC Contract, SCE&G and Santee Cooper were required to pay actual prices for Craft Labor and supporting indirect labor (i.e., on-site labor to support direct craft workers) and associated materials and supplies. As the project progressed, we became very concerned with poor labor productivity and poor efficiency ratios for indirect labor costs. In June 2015, we began re-computing invoices for these expenses as if the project had met projected productivity and efficiency factors on which earlier project budgets had been based. We disputed the amounts that exceeded the recomputed invoices based on the assertion that the failure to meet the initial projections constituted a failure to use "Good Industry Practices" as required by the EPC Contract. …

PRODUCTIVITY

In our last proceeding before this Commission, we committed to you that we would continue to negotiate with the Consortium to reduce these costs and to resolve these matters."

Testimony of Kevin B. Marsh, October 4, 2016, 2016-223-E, Transcript at 197.

(Cross examination by Commissioner Fleming, addressing workforce)

"Q: And the workforce?

A: The workforce, they have taken quite a few measures. They have reached out extensively across the country to bring in additional workers. They've been pretty successful doing that. Although, with any project of this size you do have turnover, so while you are bringing in 10 you've got to make sure you don't have three leaving, so you get the net increase in the workers that you need. They've been successful in doing that, to date. They're going to continue to need to be more aggressive in terms of finding those workers as the work ramps up.

They've been unique and novel, I think, in looking at some of the approaches to address the work that needs to be done. They have a non-English-speaking group that they have negotiated with that comes in, where they can assign particular scopes of work to a group of people that are non-English speaking, but they have an English-speaking supervisor so he can communicate both with the Fluor and Westinghouse team and also effectively with the workers on-site. They've been successful at doing that. We have very few labor union workers on the site today, other than those from CB&I that continue to do some of the welding as a subcontractor, but they've been successful in doing that. They're also exploring the possibility of bringing in some union workers, again, where they can isolate that work effectively without impacting the ongoing construction team.

So I believe Fluor is pretty creative in trying to identify workers and make sure we can ramp the workforce up."

Pre-filed Direct Testimony of Stephen A. Byrne, July 1, 2016, 2016-223-E, Transcript at 448-449.

"The Consortium argued that the productivity and efficiency ratios that it used in preparing the prior forecasts were estimates only and SCE&G and Santee Cooper were contractually at risk to pay actual costs. In response, SCE&G and Santee Cooper argued that the EPC Contract contained terms requiring the Consortium to construct the Units using "Good Industry Practice," which encompasses "the practices, methods, standards and acts engaged in and generally acceptable to the nuclear power industry in the United States." SCE&G and Santee Cooper asserted that the failure by the Consortium to achieve its earlier productivity and efficiency estimates was the result of the Consortium's failure to use Good Industry Practice."

PRODUCTIVITY

Pre-filed Direct Testimony of Stephen A. Byrne, July 1, 2016, 2016-223-E, Transcript at 448.

"One group of challenged costs involved invoices that SCE&G and Santee Cooper refused to pay based on productivity concerns. As I indicated earlier in my testimony, beginning in June of 2015, for each invoice involving Target labor, we calculated an alternative invoice by applying the labor productivity factors and labor efficiency ratios that the Consortium used in its original project cost forecasts. (Labor efficiency ratios are the ratios of Indirect Labor and Field Non-Manual labor associated with Direct Craft Labor.) We disputed the difference between the actual and alternative invoices, and withheld 10% of the disputed amount as the EPC Contract provided."

Testimony of Stephen A. Byrne, October 12, 2016, 2016-223-E, Transcript at 395-396.

"In addition, one of Fluor's principal goals today is to implement mitigation plans to meet schedule goals. These mitigation plans will require more total units of labor, more shifts of workers on the site, and more supervisory and indirect labor to support those new work shifts. Westinghouse and Fluor will need to offer higher pay to attract workers who are willing to work the extended hours and these back shifts. For those reasons, we believe that the schedule mitigation will limit opportunities for improving the labor costs."

Also stated during cross examination by Commissioner Hamilton at Transcript page 624.

Testimony of Stephen A. Byrne, October 12, 2016, 2016-223-E, Transcript at 620-621.

(Cross examination by Commissioner Hamilton)

"Q: Have you been able to see, since you've been under the new contract, any improvement in the productivity and efficiency of employees on Unit 3 versus Unit 2?

A: We have seen increases in productivity on Unit 3 over Unit 2. It's hard to say whether those are a function of the contract or a function of Fluor, but had we not entered into the contract, we would not have gotten Fluor. So from that respect, you can say that it's a direct relationship with the contract.

The Westinghouse team, as well, has been changed somewhat on the site. Our Westinghouse team lead has been there for probably 18 months now, and that person seems to be driving towards meeting goals a lot better than his predecessors were…So what we're seeing is, they are hitting milestones. One of the things we're not necessarily seeing yet is the productivity improvements we need to see on Unit 2. Unit 3 is improving because, obviously, they learned lessons on Unit 2."

Testimony of Stephen A. Byrne, October 12, 2016, 2016-223-E, Transcript at 657-658.

(Cross examination by Commissioner Fleming)

"Q: And so, you feel like working with Fluor is the answer to improve the productivity?

A: Yeah, I think Fluor is in a much better position to improve productivity than CB&I or Shaw ever were…."

Pre-filed Testimony of Allyn Powell, ORS, September 1, 2016, 2016-223-E, Transcript at 725-726.

"Westinghouse has further indicated that the current construction schedule cannot be met without substantial improvement in current production and productivity rates. The current schedule requires the simultaneous use of numerous mitigation strategies, which are worked outside of the main schedule and increase ORS's concern regarding the uncertainty in the schedule. Meeting the current construction schedule will require substantial improvements in both productivity and production….ORS has seen positive changes recently, but with Fluor's fully resource-loaded construction schedule still outstanding a great deal of uncertainty remains. While ORS believes the sequence of construction activities to be valid, ORS has concerns these activities may take longer than previously estimated…."

Pre-filed Testimony of Gary Jones, ORS, September 1, 2016, 2016-223-E, Transcript at 902-903.

"In April 2016, Fluor assumed direct responsibility for craft labor on the Project after working with Westinghouse since January 2016. The evolution of this transition has been slower than anticipated, and as such the full impact of Fluor's process improvements has not yet been realized. However, there are significant process and procedural changes that are underway, which include implementing more streamlined and effective construction work packages to expedite work in the field, changes in the procurement areas to better ensure that construction commodities are available when required and do not delay welders, expedite the availability of welding commodities, and accelerate the welding production; and changes in the field engineering support to reduce turn-around time on design change requests and reduce construction delays.

These changes and other process improvements must be promptly implemented, in addition to significantly increasing the construction labor force, if the increased production levels required to support the Project schedule are to be obtained."

Letter from Dukes Scott to SCE&G, July 12, 2016, incorporating SCE&G's Responses to June 30, 2016 Letter

"SCE&G asserts that SCE&G and Santee Cooper have initiated an effort with Westinghouse and Fluor to align the four companies on the top five project focus areas; the productivity factor will be addressed in one of these five areas, which is construction efficiency and schedule adherence. Fluor has analyzed the Shaw and CB&I Power project controls system and determined that it is necessary to convert the project to Fluor's controls system. Once completed, a more meaningful productivity factor can be monitored and used to identify issues by discipline/area and to more accurately predict resource needs. SCE&G anticipates that initiatives in the other four top focus areas—prevention and timely resolution of design issues,

modules, construction resources, and procurement—will also improve the site craft productivity factor.

…

SCE&G replies that construction resources is a top five project focus area and that Fluor has provided metrics on recruiting and attrition to a much higher level of detail and greater depth than previously provided by CB&I. SCE&G further informs ORS that Westinghouse and Fluor are in the process of pursuing a number of mitigation strategies to increase the number of craft labor personnel including, among other things, evaluating craft compensation packages (mobilization, pay rate, per diem, retention incentive, etc.) against current markets for each discipline; subcontracting to augment direct hire craft; and relocating demobilized craft at other Fluor projects to V.C. Summer."

…

SCE&G has scheduled a review of the Functional Area Assessment reports and actions with ORS on July 27, 2016."

Letter from Dukes Scott to SCE&G, August 8, 2016

"Very informative briefings were provided by Carl Churchman (Westinghouse Vice President and Project Director) and Jeff Hawkins (Fluor Vice President and Site Project Director). They provided their perspective on the project status and the process improvements underway with respect to site industrial safety, the nuclear safety culture among the workforce, procurement, the project schedule, labor productivity and staffing, module fabrication and installation, field engineering and other aspects of the construction of the plant. Each voiced their deep commitment to completing the project and recognized several key challenges that must be overcome to meet the project schedule.

…

Craft labor productivity still continues to be an issue on the project. The target direct craft labor performance factors are still not being met and overall productivity is still falling significantly short of the goals set by Westinghouse and Fluor earlier this year. The previous monthly production goal for June was for approximately 1.25% of the work remaining to be completed during the month while the actual value achieved was 0.6%. The project construction was scheduled to be at about 25% complete by the end of June while it was actually at about 22% complete. This remains a serious issue that requires continued focus."

September 30, 2016 Quarterly Report at 7.

"During the period, Fluor continued to implement changes to streamline processes and implement performance improvements based on its Functional Area Assessments (FAAs). Fluor's review of the Integrated Project Schedule (IPS) is ongoing and review and issuance of the plan by WEC is expected to take place around the end of 2016."

3. DESIGN FINALIZATION

Bechtel Executive Summary: Issues Facing the Project, p. 1; Conclusions: Top Priority Recommendations, p. 62

- The detailed engineering design is not yet completed which will subsequently affect the performance of procurement and construction.
- The issued design is often not constructible resulting in a significant number of changes and causing delays.

*****

- Consortium – Initiate a focused effort to complete WEC known engineering "debt". (O&Rs E2 and E9)
- Consortium – WEC engineering maintain focus on releasing the over 1,000 drawing holds that exist. (O&R E13)

Pre-Bechtel Report

March 31, 2014 Quarterly Report at 17.

"As of March 31, 2014, the Units 2 & 3 plant design packages issued for construction (IFC) are 88% complete. This is a lower number than previously reported. WEC/CB&I has informed SCE&G that the change results from a change in the count of plant design packages to be produced due in part to the comprehensive review of engineering requirements which was underway at the close of the period (see Section I.C. above). SCE&G has requested WEC/CB&I to justify this position. IFC delivery from WEC/CB&I continues to be a focus area and SCE&G is conducting monthly oversight meetings with WEC/CB&I concerning this issue."

Pre-filed Direct Testimony of Carlette L. Walker, May 26, 2015, 2015-103-E, Transcript at 616-617.

"Design changes by WEC also have increased the anticipated number of LARS [License Amendment Requests] required during the construction process, and WEC projects that additional licensing support will be necessary to process these LARs."

Pre-filed Direct Testimony of Stephen A. Byrne, May 26, 2015, 2015-103-E, Transcript at 245-246.

"Design finalization has been an important risk factor for the project since its inception. As we stated in 2008,

DESIGN FINALIZATION

> Under the current NRC licensing approach, there is engineering work related to the Units that will not be completed until after the COL is issued. Any engineering or design changes that arise out of that work, or the engineering or design changes required to address problems that arise once construction is underway, are potential risks which could impact cost schedules and construction schedules for the Units.

Combined Application in Docket No. 2008-196-E at Exhibit J, page 6.

The most challenging aspect of design finalization of the AP1000 Units is finalization of the Nuclear Island ("NI"). The NI includes the Shield Building and containment vessel which house the reactor, steam-generators, refueling equipment and passive safety components of the Units, and the Auxiliary Building, which houses other nuclear components of the plant. Design delay and design changes related to the NI have been a major source of delay in the project to date and have contributed to delay in submodule production. As of May 2015, design finalization for the NI was approaching completion, indicating that risks associated with this aspect of the project are being mitigated."

Pre-filed Direct Testimony of Kevin B. Marsh, May 26, 2015, 2015-103-E, Transcript at 88-90 (quoting Combined Application, Docket No. 2008-196-E, Exhibit J, p. 6-12).

"SCE&G's 2008 BLRA application acknowledged that, "[f]or a project of the scope and complexity of the licensing and constructing of the Units, any list of potential risk factors compiled at this stage of the process will not be exhaustive." Petition, Docket No. 2008-196-E, Exhibit J, p. 12. With that caveat, SCE&G listed the specific risks that seemed most important at the time. Among the risks specifically enumerated at that time were many, if not all, of the risks that have resulted in the current update filing:…

- Design Finalization: "[T]here is engineering work related to the Units that will not be completed until after the COL [Combined Operating License] is issued. Any engineering or design changes that arise out of that work . . . could impact cost schedules or construction schedules for the Units."

Testimony of Kevin B. Marsh, July 21, 2015, 2015-103-E, Transcript at 129.

(Cross examination by Robert Guild)

"We discussed that with the Commission at the initial filing, that these plants to be built at the Jenkinsville site, as well as the ones built at Vogtle by Georgia Power, are the only ones being built in the United States. However, there are four AP1000s under construction in China that started several years before our project started, and we expected and have received some design changes from that process. Mr. Byrne can address that in more detail. But we've tried to incorporate design changes that were considered necessary, that refined the original design, into our process. Of course, it takes time and effort to do that, and that has contributed to some of the delays we have encountered. Mr. Byrne can go into more detail, but there could be constructability issues by the fabricator as they take the design drawings and try to actually

produce the work that's in the design drawings, and they have to go back to the designers to work through those issues."

Testimony of Kevin B. Marsh, July 21, 2015, 2015-103-E, Transcript at 132-133.

(Cross examination by Robert Guild)

"On a project of this size, you know, design finalization is rarely completed when a project starts. We built our Cope generating facility, our coal fired plant, back in 1996. The design was not completed when that plant started construction. It's typically completed along the way and finishes in time to make sure the components are available and the design is available to finish the project. So there's design that takes place throughout the process.

We never represented to the Commission that the design was completed. We offered that this was a new design; a conceptual design has been done. The design had been certified by the Nuclear Regulatory Commission. There were several dockets that were heard before the Nuclear Regulatory Commission to certify that design. And there were a number of dockets—if I recall, it was probably 18 or 19. I think the design certification was probably docket 19, if I remember my numbers correctly. But there was a lot of work on the initial design, but the detailed design of the individual components had to be done as the project was under construction.

Certainly, a large percentage of that is done now. There remains a percentage that will still need to be completed as we move forward. I'll ask you to get Mr. Byrne to give some more detail on that, but we have never represented that the design was completed from the day we started the project. That's not customarily the way large projects of any kind are done, whether it's a large power plant or a large project for any other type facility."

June 30, 2015 Quarterly Report at 2-3.

"It is SCE&G's position that the delay and the majority of the increased costs reflected in the current schedules have been due to WEC/CB&I's failure to meet its contractual obligations related to structural module fabrication, timely design finalization, labor productivity, indirect labor costs and other matters, all despite SCE&G's repeated insistence upon improvements in performance. Accordingly, SCE&G has advised WEC/CB&I that it remains contractually obligated to satisfy the Guaranteed Substantial Completion Dates previously agreed to in the EPC Contract and other obligations under the EPC Contract, and WEC/CB&I is liable for costs associated with delay and other matters."

Letter from Dukes Scott to SCE&G, October 14, 2015

On September 10, 2015, ORS consultant, Gary Jones, visited Greenberry and Vigor (previously Oregon Iron Works) module-fabrication facilities located near Portland, Oregon. Below are ORS observations and recommendations resulting from Mr. Jones' visit; SCE&G needs to:

…

DESIGN FINALIZATION

- Continue to pursue the release of design-change documentation to the fabricators. Changes have been held by CB&I and not released to the fabricators because of contract cost-dispute issues between Westinghouse and CB&I. At the time of their meeting, no changes had been released to Greenberry since late March of this year and none had been released to Vigor since early June. The withholding of design-change documentation represents hundreds of changes and has resulted in delays in delivery; it will also result in extensive rework at the site once the modules are received. Subsequent to their meetings, Mr., Jones was advised by SCE&G that action has been taken on this issue and that the changes were being prioritized by CB&I and released to the fabricators for incorporation. However, this momentum needs to continue and detailed monitoring is required.

December 31, 2015 Quarterly Report at 14.

"WEC and Fluor are moving to standardize and simplify work packages for construction activity related to the nuclear islands (NIs) for the four units, streamline the processes for the transfer of equipment between suppliers and contractors, and minimize design changes being communicated to module and submodule vendors.

****

Design changes continue to be communicated by WEC to submodule fabrication vendors. The work of incorporating these changes into the fabrication process continues to delay submodule production. This is an area that WEC and Fluor intend to address going forward."

Letter from Dukes Scott to SCE&G, January 5, 2016

"One of the most significant drains on project construction productivity has been the inability to maintain the craft focused on a work activity due to incomplete or inadequate work packages and material availability. Ensuring accurate and complete preparation of construction work packages should be a top priority that is continually monitored."

DESIGN FINALIZATION

Post-Bechtel Matters

June 30, 2016 Quarterly Report at 12.

"Design changes continue to be communicated by WEC to submodule fabrication vendors on a schedule that disrupts the fabrication process and delays submodule production. WEC has trained 30 former CB&I engineers who are now employees of the newly formed WEC subsidiary WECTEC to support module design work and the prompt resolution of constructability and fabrication issues. This is a focus area for improving schedule performance and construction efficiency and is receiving a high level of attention from WEC and Fluor."

Letter from Dukes Scott to SCE&G, June 30, 2016

"Design changes continue to adversely affect fabrication and construction schedules. The number of design changes appears to be high considering the design completion status that the ORS understood in the early stages of the project. The factors driving these changes need to be further investigated, and additional management controls need to be established with the goal of reducing the frequency of design changes to only those that are absolutely required."

Letter from Dukes Scott to SCE&G, July 12, 2016, incorporating SCE&G's Responses to June 30, 2016 Letter

"SCE&G states that prevention and timely resolution of design issues is a top five focus area for the project. Westinghouse and Fluor are undertaking advanced planning initiatives to maximize early identification and resolution of potential issues; increasing accountability to build as designed where practical and ensure alignment between construction and engineering; and focusing engineering resources on critical areas. The use of field engineering resources and "clash" software by Westinghouse and Fluor is beginning to pay dividends. A recent example is a set of four work packages where 111 issues were identified and corrected prior to work commencing, and only four issues were identified after work commenced. In addition, SCE&G is working with Southern Nuclear and the NRC to add a new license condition to allow construction work to proceed at risk where a License Amendment Request (LAR) is needed.

****

"SCE&G has informed ORS that it has discussed these issues with Westinghouse on a regular basis.

4. OWNER'S PROJECT MANAGEMENT/OVERSIGHT FUNCTION

Bechtel Executive Summary: Issues Facing the Project; Top Priority Recommendations p. 1-2

- The oversight approach taken by the Owners does not allow for real-time, appropriate cost and schedule mitigation.

*****

- Owners – Develop an Owners' Project Management Organization (PMO) and supplement current Owner staff with additional EPC-experienced personnel.

Pre-Bechtel Report

September 30, 2015 Quarterly Report at 10.

"During the period, WEC/CB&I initiated a new Project Management Organization (PMO) to provide a centralized location and project team on site to coordinate all work activities. The PMO's leaders are instituting new approaches to align and focus resources and activities and to organize work at the site."

December 31, 2015 Quarterly Report at 2.

"During the period, SCE&G initiated a new Project Management Organization (PMO) to provide direct oversight of the WEC PMO that was organized last quarter. The SCE&G PMO mirrors the structure of WEC's PMO. It is led by a SCE&G Project Manager as a single point of accountability to oversee the schedule and cost aspects of construction oversight activities of the New Nuclear Deployment (NND) group. SCE&G's PMO leadership is instituting new approaches to align and focus resources and activities to assist Fluor to better organize work at the site. It will oversee the Integrated Project Schedule (IPS), and provide project management for non-EPC Contract related construction activities."

March 31, 2016 Quarterly Report at 2.

"The new SCE&G Project Management Organization (PMO) aligns SCE&G's project management oversight with Westinghouse's and Fluor's efforts. It has been implemented and is working effectively."

Repeated in the June 30, 2016 Quarterly Report.

5. PROJECT SCHEDULE

Bechtel Executive Summary: Issues Facing the Project, p. 1; Issues to be Resolved, p. 61; Conclusions: Top Priority Recommendations, p. 62

- While the Consortium's engineering, procurement, and construction (EPC) plans and schedules are integrated, the plans and schedules are not reflective of actual project circumstances.

*****

- Consortium – Create a new, more achievable, project schedule. Remove the mandatory constraints from the Integrated Project Schedule and allow the schedule to move based on the logic. Prioritize the development of mitigation/recovery plans based on their impact to the schedule. Ensure appropriate time is allocated for the installation of bulk commodities (large and small bore piping, pipe supports, cable tray, conduit, cabling).

- The Consortium's forecasts for schedule durations, productivity, forecasted manpower peaks, and percent complete do not have a firm basis.

Pre-Bechtel Report

June 30, 2014 Quarterly Report at 2-3.

"During the third quarter of 2013, WEC/CB&I provided SCE&G with revised Unit 2 and Unit 3 construction schedules (Revised Unit 2 and Unit 3 Schedules) which were based on a reevaluation of the submodule production schedule at the CB&I facility in Lake Charles, LA. Based on these schedules, it was anticipated that Units 2 and 3 would be completed in the last quarters of 2017 and 2018 or the first quarters of 2018 and 2019, respectively. From an Engineering, Procurement and Construction Contract (EPC Contract) perspective, SCE&G did not agree to these schedule changes and advised WEC/CB&I that it remained obligated to satisfy the dates previously agreed to in the EPC Contract, as amended."

This was also repeated in the March, 31, 2014 Quarterly Report at 2.

June 30, 2014 Quarterly Report at 2-3.

"During the fourth quarter of 2013, the Consortium began a full re-baselining of the Unit 2 and Unit 3 construction schedules to incorporate a more detailed evaluation of the engineering and procurement activities necessary to accomplish the schedules and to provide a detailed reassessment of the impact of the Revised Unit 2 and Unit 3 Schedules on engineering and design resource allocations, procurement, construction work crew efficiencies, and other items. The result will be a revised fully integrated project schedule with timing of specific construction activities along with detailed information on budget, cost and cash flow requirements (Revised

Fully Integrated Construction Schedule). While this detailed re-baselining of construction schedules has not been completed, in August 2014, SCE&G received preliminary information in which the Consortium has indicated that the substantial completion of Unit 2 is expected to occur in late 2018 or the first half of 2019 and that the substantial completion of Unit 3 may be approximately 12 months later. These expected substantial completion dates do not reflect all efforts that may be possible to mitigate delay nor has SCE&G accepted this new schedule. The Consortium has not yet provided any cost estimates related to the delay. Further, based on the preliminary schedule information arising from the re-baselining effort, the completion dates for a number of milestones are expected to extend beyond the 18-month contingency period. SCE&G anticipates that the revised schedule and the cost estimate at completion will be finalized in the latter half of 2014. SCE&G plans to reevaluate and reschedules its owners cost estimates and cash flow requirements in light of that new schedule when it is finalized. Upon completion of the re-baselining and the finalization of the revised schedule and cost of completion, SCE&G expects to petition the Commission for an order to update the Base Load Review Act (BLRA) construction milestone schedule and/or capital cost estimates schedule for the project as the BLRA permits."

June 30, 2014 Quarterly Report at 2-3.

"SCE&G cannot predict with certainty the extent to which the delays in the substantial completion of the Units will result in increased project costs. SCE&G has not accepted responsibility for any delay-related costs and expects to have discussions with the Consortium regarding such responsibility. Additionally, the EPC Contract provides for liquidated damages in the event of a delay in the completion of the facility, which will also be included in discussions with the Consortium."

These same reports were repeated in the September 30, 2014 report, December 31, 2014 Quarterly Report, and March 31, 2015 Quarterly Report.

March 31, 2015 Quarterly Report at 2-3.

"During the first quarter of 2015, SCE&G determined that the joint review of the Revised, Fully-Integrated Construction Schedule and the evaluation of mitigation strategies had progressed sufficiently for SCE&G to recognize the Consortium's Revised, Fully-Integrated Construction Schedule as the project schedule for the Base Load Review Act (BLRA) reporting purposes and other purposes related to the management of the project."

March 31, 2015 Quarterly Report at 4.

"Based on these new cost and schedule forecasts, SCE&G filed the March 2015 Update Petition seeking Commission approval of a new capital cost schedule and construction schedule for the Units. The Revised, Fully-Integrated Construction Schedule included with the March 2015 Update Petition is based upon SCE&G's review and analysis of the information provided to the Company by the Consortium. As a result of its review and analysis and representations of the Consortium, SCE&G has recognized the construction schedule as the anticipated construction schedule for the project and as a reasonable and prudent schedule for approval by the Commission under the BLRA."

PROJECT SCHEDULE

Pre-filed Direct Testimony of Stephen A. Byrne, May 26, 2015, 2015-103-E, Transcript at 277.

"At present, SCE&G is challenging several categories of costs being billed to it by WEC/CB&I. Those challenges include:

…

Cost invoiced by WEC/CB&I which are related to general project delay. SCE&G takes the position that these delay costs are WEC/CB&I payment responsibility for reasons including WEC/CB&I failure to meet its responsibilities under the EPC Contract to effectively manage the project.

Letter from Dukes Scott to SCE&G, October 14, 2015

"With regard to the 2015-09-22 and 2015-09-23 visit to the V.C. Summer site, ORS staff and Mr. Jones were advised that no schedule update was provided to SCE&G by the Consortium in August. The reason provided is that the schedule is being revised to reflect the current delays in the shield building panel deliveries from the fabricator (Newport News Industrial) and the delays in the erection of the shield building panels. These delays are above and beyond those outlined in the recent SCE&G filing under Docket No. 2015-103-E that were approved by the PSC as well as those that had been reported to the ORS in July. It was stated that the expected delay will be an additional four months."

Letter from Dukes Scott to SCE&G, December 14, 2015

"The construction schedule for Unit 3 has not been adequately integrated considering proper sequencing of precursor activities. In addition, the required resources have not been adequately assessed, especially with regard to the impact of delays in the construction of Unit 2 and how this will impact the staffing of Unit 3. The current schedule utilizes overly optimistic assumptions with regard to acceleration of module deliveries and erection, construction productivity improvements on all commodities, and the acceleration of testing and start-up activities. SCE&G needs to reassess the Unit 3 schedule with the EPC Contractor.

. . . .

The required mitigation approach to accelerate the Unit 2 and Unit 3 Shield Building panels from Newport News Industrial was not finalized, and it is not clear that the approach is still viable. SCE&G needs to determine whether mitigation is still an option and determine the impact on the Project.

. . . .

The increased labor productivity rates necessary to attain the completion dates for the Project have not been realized, and no discernable progress has occurred. Some additional delays can be expected in the transition relating to CB&I's departure and Fluor coming up to speed; therefore, it is difficult to understand how these delays, coupled with the continued below-par productivity rates, support the Project completion dates. This issue will need to be addressed by SCE&G once the transition is completed."

PROJECT SCHEDULE

Post-Bechtel Report

Letter from Dukes Scott to SCE&G, May 13, 2016

"The ORS met with the lead Westinghouse Electric Company (WEC) project scheduling staff for the first time since Fluor became involved in the project. This meeting allowed the ORS to review the current revised integrated project schedule in more detail. The ORS now has a better understanding of the assumptions and bases of the schedule and the process of its development over the past few months. We learned that the initial schedule presented by WEC in August 2015 had arbitrarily held constraints that resulted in an unreliable and unrealistic depiction of the schedule for the remaining work. SCE&G and the on-site WECTEC project schedulers have worked to refine and accurately represent the remaining work and the logical ties among the work activities, as well as to reduce the number of arbitrary constraints. The ORS also obtained a better understanding of the documentation available to help us understand the schedule, including a more detailed Project Plan-of-the Day package. However, the ORS remains concerned that the schedule still needs refinement and has not yet received a complete detailed review and revision by Fluor that includes the resources needed to complete each task. This review will not be completed until the third quarter of this year. By that time, the ORS is concerned that additional delays may be identified in the project completion dates, especially on Unit 3."

PROJECT SCHEDULE

Testimony of Kevin B. Marsh, October 4, 2016, 2016-223-E, Transcript at 193-194.

(cross examination by Commissioner Fleming)

"Q: Okay. I'd like to ask you, what do you think are the two or three biggest challenges to successfully completing the V.C. Summer units?

A: There are probably a number of these, and I'm sure Mr. Byrne will correct me if he doesn't agree with me. But, certainly, the completion of the shield building on the first unit. That shield building is one of the newest designs, and in making sure we can fabricate the parts and have them delivered on-site in timely fashion, weld those together and get those places on the nuclear island in a timely fashion and to have those completed…Making sure that design is completed, so those pieces can be delivered in time for early completion of the units or on-time completion of the units is something that I follow pretty closely.

On the second unit, I think it's more with some of the structures on the base end of the new unit, making sure we get out of the ground in a timely fashion….

I continue to have concerns about Fluor being able to attract enough qualified workers to the site. There are a lot of large projects going on around the Southeast right now that don't involve nuclear, and some workers may prefer not to work in a nuclear environment where you have strict guidelines and strict rules in terms of compliance and documentation and quality control. So making sure we get enough workers on-site is a concern of mine, too.

Q: Okay. And what about the lack of a resource-loaded integrated schedule for the completion?

A: We have a schedule in place today. It was the one that was in place when Fluor completed the—when Fluor came on-site with the new contract. They're in the process of going through that schedule today to make any changes they deem appropriate….

Now, their schedule moves—and if you're looking at a live schedule, they may be ahead a month, maybe behind a couple of months, and that's normal with a project of this size and they're making adjustments to account for those changes as we go through time. It's just not a firm date that never moves when you go through that construction process. They believe they can attract the resources to do that, and I will continue to ask them that question every time we meet."

Testimony of Stephen A. Byrne, October 12, 2016, 2016-223-E, Transcript at 642.

(Cross examination by Commissioner Elam)

"A: Yes. So the functional area review team started, actually, before Fluor even came on-site, so they started back in the November-December timeframe; they're continuing today. They include members from Fluor and Westinghouse, from SCE&G, and from Southern Company, and they took a look at discrete areas where they thought that they had opportunities for significant improvement.

Work planning was one example, part of that. They took a look at the work packages that they would give the craft, and they said, 'This is too difficult; we need to streamline those." So they've implemented that plans to streamline those.'"

Pre-filed Testimony of Allyn Powell, ORS, September 1, 2016, 2016-223-E, Transcript at 732.

"With respect to the schedule, ORS is concerned regarding the degree of uncertainty remaining regarding the schedule…ORS believes that these dates are optimistic, but that the Project is likely to be completed within 18 months of these dates. For this reason, ORS does not oppose the revised GSCD and BLRA milestone schedule. …"

Testimony of Allyn Powell, ORS, October 12, 2016, 2016-223-E, Transcript at 743.

(cross examination by Robert Guild)

"A: …What ORS was very concerned about is that there's a lot of uncertainty, in our minds, regarding the construction schedule and how long it's going to take to complete the project, how many man-hours it's going to take to complete the project. We would be much more comfortable if we had Fluor's input at this point, to help us with that…."

Pre-filed Testimony of Gary Jones, ORS, September 1, 2016, 2016-223-E, Transcript at 923.

"SCE&G still does not have a reliable schedule for the Project, and will not have a reliable schedule until Fluor completes its review and works through the resource-loaded integrated schedule which is due in the fourth quarter of 2016. …Fluor's review of and revision to the schedule represent a significant milestone for the Project."

June 30, 2016 Quarterly Report at 2.

"Fluor's review of the Integrated Project Schedule (IPS) continues and will incorporate changes due to the October 2015 Amendment to the EPC Contract (Amendment), the FAAs, and the analysis of schedule mitigation plans. These changes are anticipated to focus principally on the scheduling and sequences of construction activities within the current Guaranteed Substantial Completion Dates (GSCDs). Changes in the IPS are not anticipated to affect the GSCDs themselves which are contractually established."

Letter from Dukes Scott to SCE&G, June 30, 2016

"Consistently meeting the construction schedule continues be a significant issue for the project. This area must improve if any credibility is to be assigned to the current substantial completion dates and associated mitigation strategies that must be implemented in order to bring the plant to completion."

Letter from Dukes Scott to SCE&G, August 8, 2016

PROJECT SCHEDULE

"Very informative briefings were provided by Carl Churchman (Westinghouse Vice President and Project Director) and Jeff Hawkins (Fluor Vice President and Site Project Director). They provided their perspective on the project status and the process improvements underway with respect to site industrial safety, the nuclear safety culture among the workforce, procurement, the project schedule, labor productivity and staffing, module fabrication and installation, field engineering and other aspects of the construction of the plant. Each voiced their deep commitment to completing the project and recognized several key challenges that must be overcome to meet the project schedule.

…

ORS also had the opportunity to meet with senior SCE&G staff to discuss observations made during this visit. At the end of the visit, ORS met with Ron Jones, SCE&G and Jeff Archie. ORS provided an assessment of our concerns, especially with regard to schedule performance and the bases for cost increases and change orders being discussed as part of Docket No. 2016-223-E. ORS also discussed observations related to quality programs."

September 30, 2016 Quarterly Report at 7.

"During the period, Fluor continued to implement changes to streamline processes and implement performance improvements based on its Functional Area Assessments (FAAs). Fluor's review of the Integrated Project Schedule (IPS) is ongoing and review and issuance of the plan by WEC is expected to take place around the end of 2016."

Letter from Kevin Marsh to Dukes Scott, January 18, 2017

"Thanks for your letter dated December 29, 2016 regarding the recent announcement by Toshiba and Westinghouse of pending write-downs associated with the Summer and Vogtle AP1000 nuclear projects. I share your concerns regarding the impact of these write-downs and the delivery of the revised fully integrated construction schedule (the "revised schedule"). As we discussed, our SCANA team along with representatives of Santee Cooper met with Westinghouse and Toshiba in an effort to learn more about this situation and inquire about the delivery of the revised schedule we were expecting by the end of 2016. I also share your high level of interest in receiving the revised schedule as soon as possible.

I provided Westinghouse and Toshiba a copy of your letter to emphasize the importance of having access to the schedule as part of our commitment to keeping both the Office of Regulatory Staff and the Public Service Commission of SC updated on the status of the new nuclear project. Westinghouse and Toshiba have informed me that the revised schedule is a part of the financial review and evaluation of the pending write-downs associated with the AP1000 projects, and that they expect the revised schedule to be available at the time Toshiba releases its financial results in mid-February.

We continue to communicate with Westinghouse and Toshiba in order to monitor this situation as closely as possible and will update you accordingly."

PROJECT SCHEDULE

6. PROCUREMENT

Bechtel Executive Summary: Top Priority Recommendations, p. 3; Bechtel Conclusions: Issues to be Resolved, p. 61-62; Conclusions: Top Priority Recommendations, p. 63-63

- Consortium – Complete the inventory revalidation effort and establish a program to continually validate inventory. Complete the procurement schedule adherence effort to ensure equipment delivery dates meet construction need dates.

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- There is a significant disconnect between construction need dates and procurement delivery dates.
- The amount of stored material onsite is significant, creating the need for an extended storage and maintenance program.

*****

- Consortium - Expedite the implementation of blanket purchase orders. (O&R P8)

- Consortium - Complete the procurement schedule adherence effort to ensure equipment delivery dates meet construction need dates. (O&R P17)

Post-Bechtel Report

Letter from Dukes Scott to SCE&G, May 13, 2006

"Continuing commodity shortages have resulted in delays. Fluor is to assume greater responsibilities in commodities purchasing and control, and SCE&G hopes to see improvements soon.

. . . .

Progress in completing the so-called "Reactor Containment" areas of the Unit 2 Auxiliary Building that support the SB panels has been problematic, primarily due to design changes and commodity shortages. This area is very near critical path and needs additional focus and effort."

June 30, 2016 Quarterly Report at 11.

"Fluor is overhauling the legacy Chicago Bridge & Iron Company (CB&I) processes for requisition, procurement and delivery of commodities and other materials and supplies used on

site. CB&I's system was geared to 'just in time' delivery which did not allow for sufficient time to process deliveries for documentation review, inspection, stocking and distribution. Delays resulted in shortages that created construction inefficiencies. Fluor is moving to remedy this situation."

Letter from Dukes Scott to SCE&G, June 30, 2016

"The lack of availability of key commodities continues to plague the project and result in construction delays. Note that this issue is not tied to major components, as most of these are now on-site far ahead of their actual construction need date. The commodities in question are rebar, welding rod, standard structural steel, bolting, lubricants, steel plates, Nelson studs, and other standard construction commodities. These shortages are the result of Westinghouse's "just-in-time" approach to the ordering and delivery of these commodities. This approach has proved to be ineffective as the components are not available when required. On large construction projects, such commodities are routinely stocked in sufficient quantity to ensure they do not delay construction. Our consultant states that he has never worked on a nuclear project that was delayed by the lack of availability of standard rebar. At VCS, standard rebar unavailability has resulted in construction delays of critical path activities."

Letter from Dukes Scott to SCE&G, July 12, 2016, incorporating SCE&G's Responses to June 30, 2016 Letter

"SCE&G states that SCE&G, Santee Cooper, Westinghouse, and Fluor all agree that procurement is a top five focus area for the project. To address availability of key commodities, Westinghouse has recently consolidated the responsibility for delivery of material and equipment into a single organization so that each commodity now has a single point of accountability for scope, schedule, and budget. This organizational transition was completed at the end of June 2016."

Testimony of Stephen A. Byrne, October 12, 2016, 2016-223-E, Transcript at 643.

(Cross examination by Commissioner Elam)

"A: …Procurement is one that is still going. The procurement area is one that Fluor saw a lot of areas that they can improve, and so they've implemented a lot of plans in procurement, but there's more coming."

Letter from Dukes Scott to SCE&G, August 8, 2016

"Very informative briefings were provided by Carl Churchman (Westinghouse Vice President and Project Director) and Jeff Hawkins (Fluor Vice President and Site Project Director). They provided their perspective on the project status and the process improvements underway with respect to site industrial safety, the nuclear safety culture among the workforce, procurement, the project schedule, labor productivity and staffing, module fabrication and installation, field engineering and other aspects of the construction of the plant. . . . .

An additional special briefing was held with Dan Magnarelli (Westinghouse), who heads up the Functional Area Assessments, and Rob Carlon and Mike Valore (Fluor) who are also working in this area. The status of these assessments and the implementation of the recommendations from at least some of these assessments are more advanced than we had previously understood. This briefing concentrated on the assessment of the procurement process and we learned the minimum/maximum methodology for the purchase of construction commodities is being implemented in several areas. This has the potential to result in decreased construction delays due to material unavailability. An extensive inventory of on-site commodities, along with an assessment of their construction readiness, is also underway. ORS plans to discuss the results of the remaining Functional Area Assessments, which cover a variety of fields including quality control, welding/NDE, field engineering and subcontracting, at future meetings."

7. LARS, ITAACS AND STARTUP

Conclusions: Issues to be Resolved, p. 61-62; Conclusions: Top Priority Recommendations, p. 63-63

- There is significant engineering and licensing workload remaining (currently over 800 engineers). ITAAC closure will be a significant effort,

Pre-Bechtel Report

Pre-filed Direct Testimony of Stephen A. Byrne, May 26, 2015, 2015-103-E, Transcript at 259-260.

"Uncertainties about how ITAACs would be administered was an important risk factor that SCE&G identified in 2008: '[T]he NRC is still developing the process for approving the results of ITAAC tests once they are completed and for resolving disputes or other issues related to the results of those tests.' Combined Application, Docket No. 2008-196-E, at Exhibit J, page 4. The NRC has now issued regulatory guidance resolving some of the outstanding issues concerning the review of ITAAC Closure Notification ("ICN") packages. See Guidance for ITAAC Closure, 80 Fed. Reg. 265 (January 2, 2015). However, there are still important issues to be resolved, such as how a hearing will be conducted if ITAAC results are challenged. Furthermore, the sheer number of ITAACs to be completed poses a challenge to the schedule for the substantial completion of the Units.

As of late May 2015, SCE&G has successfully completed 22 ITAAC packages and has submitted 20 ICN packages to the NRC. While the ITAAC process seems to be working satisfactorily at present, completing the required ITAAC program on schedule remains an important risk factor for the project."

Direct Testimony of Stephen A. Byrne, July 21, 2015, 2015-103-E, Transcript at 218.

"Another challenge will be the successful completion of inspections, tests, analysis, and acceptance criteria—or ITAAC—required to demonstrate the units' conformity with the design documents. This ITAAC process is new to the nuclear industry. Over 1700 ITAACs must be completed for the project. Initial results are good, but we are in the early stages of this process."

Post-Bechtel Report

Letter from Dukes Scott to SCE&G, August 8, 2016

"As the project progresses, an increasing number of Licensing Amendment Requests (LARs) will need to be processed each month to support construction. The number of LARSs to be processed each month must double from 4 or 5 per month to 8 to 10 per month over the next

several months in order to support construction activities. This presents another major challenge for the project."

Testimony of Stephen A. Byrne, October 12, 2016, 2016-223-E, Transcript at 524.

(Cross examination by Commissioner Howard)

"Q: Let's talk about LARs….Are you comfortable with this many LARs out there?

A: Yes, I think we've identified probably 150 LARs that we will need by the end of the project. So whatever number you are looking at, it's going to grow. When we—we load those into our schedule now, so we know when we're going to need the output of that LAR….

So the LAR process, as you point out, can take some time. It's serious; the NRC takes a lot of time to review. We take a lot of time to prepare them. We need input from Westinghouse or other vendors, significantly. But we've got every one of those loaded into our schedule. All of them now meet our construction need dates…."

September 30, 2016 Quarterly Report at 14.

"During this period, SCE&G submitted seven ITAAC Closure Notifications to the NRC. Of the 53 submitted ITAAC Closure Notifications, 49 have been verified complete and four are under review by the NRC. ITAAC submittal rates must increase significantly in 2017 to meet schedule requirements. SCE&G has raised concerns with WEC about timeliness and the level of engineering support being provided by WEC for this process. The ITAAC submittal rate is an area of focus for the project."

8. WESTINGHOUSE PRICING/FIXED PRICE OPTION

General Concern, not addressed in Bechtel Report

Post-Bechtel Report

Pre-filed Direct Testimony of Joseph M. Lynch, July 1, 2016, 2016-223-E, Transcript at 776.

"When focusing on the most likely range of 2.9% to 5.0% in labor rate growth rates and the PF falling between 1.50 and 2.00, SCE&G estimates that the cost to complete the Units will be between 10.9% [$364 million] and 29.3% [$981 million] higher than the Fixed Price option. While Westinghouse may be able to make significant improvements over past performance, SCE&G believes it is in the best interest of its customers to choose the Fixed Priced option and removed the price uncertainty that exists without it."

Pre-filed Direct Testimony of Stephen A. Byrne, July 1, 2016, 2016-223-E, Transcript at 429.

"In [the] negotiations, Westinghouse told us that it recognized the great value represented by its AP1000 business and the need to complete our project successfully to protect that value and Westinghouse's reputation worldwide. Westinghouse was willing to take on substantial new commitments under the EPC Contract to accomplish those goals.

This may turn out to be a strategy for Westinghouse. In June of 2016, less than nine months after the Amendment was executed, Westinghouse announced that it is negotiating a contract to construct six AP1000 units in India. It is working on a similar proposal to construct three new AP1000 units at the Moorside nuclear power station on the west coast of England. We also understand that there is interest in AP1000 units in Europe where nuclear power is increasingly seen as an alternative to continued reliance on Russian natural gas. The AP1000 units remain the safest, most technologically sophisticated and simplest nuclear unit available today.

In light of Westinghouse's business interests, we were able to convince Westinghouse to accept new liquidated damages that are capped at $371.8 million for the two Units."

Pre-filed Direct Testimony of Stephen A. Byrne, July 1, 2016, 2016-223-E, Transcript at 432-438.

"In the negotiations with Westinghouse, SCE&G was able to convince Westinghouse to provide us with an irrevocable option to move all remaining Firm, Target and Time and Material costs, except for $38.3 million of the Time and Material budget, to the Fixed Price category. The Fixed Price would be approximately $3.345 billion (future dollars) for all invoices paid after June 30, 2015. Any payments made after that date are credited to the Fixed Price amount. We have computed the labor productivity factor that Fluor and Westinghouse must achieve from January of 2016 forward to have actual costs to SCE&G come in less than the Fixed Price, all

other things being equal. That labor productivity factor is 1.15. We expect construction to become more efficient under Fluor and with a restructured project team. But it is unlikely that productivity will improve fast enough for the remaining work on the project to be completed at a productivity factor of 1.15 or below. Our experience with the project to date makes us believe that it is highly unlikely that Fluor and Westinghouse can bring the productivity factor to 1.15 or lower measured between January 1, 2016, and the end of the project. This tells us that, all other things being equal, exercising the Fixed Price option is best for the Company and its customers.

Testimony of Stephen A. Byrne, October 12, 2016, 2016-223-E, Transcript at 395.

"As Mr. Marsh mentioned, the fixed-price option represents an increase in the forecasted EPC costs of about $505 million. The amount is net of future change orders and certain time-and-material costs. In June of 2016, SCE&G gave notice to Westinghouse that the company and Santee Cooper had decided to exercise the option. The decision to exercise the option focused on variable labor costs. While a significant amount of the EPC contract costs were already fixed or firm, the remaining variable costs were almost entirely labor related. We concluded that it is very likely that the increase in the variable labor costs will exceed the previously approved forecast by $505.5 million, or more, over the remaining life of the project. It will be exceedingly difficult for Westinghouse and Fluor to bring cumulative productivity factors in line with those used in their own 2014 projections for EAC, or estimated completion. This is true, even if construction work becomes more productive under the new project structure."

Testimony of Stephen A. Byrne, October 12, 2016, 2016-223-E, Transcript at 580-81.

(Cross examination by Robert Guild)

"Q: All right. Now you've explained why you think the fixed-price contract is a good deal. Do you acknowledge the concern that has been expressed by ORS's nuclear expert that, historically, such fixed price contracts are more adversarial and that, instead of producing a more amicable, cooperative relationship with Westinghouse, you're likely to be in a more adversarial relationship going forward? Do you understand their concerns to that effect?

A: I'm not sure that that was the exact characterization, but I heard something along those lines from the Office of Regulatory Staff.

Q: …But if, indeed, the fixed-price contract makes your relationship more adversarial and not less adversarial, might things just go downhill even faster than they have in the past? Have you thought about that, Mr. Byrne?

A: Yeah, I don't believe they would go downhill even faster. Again, the renegotiated EPC contract has terms that are intended to specifically avoid those kinds of contentions going forward. We did have a significantly contentious environment. There were some of the commercial disputes we'd been in with Westinghouse for years; there didn't seem to be any rapid resolution to those. So the contract with its new provisions should streamline that process going forward.

So, understanding that fixed-price EPC contracts have had some issues in the past, I think coming in at this point, this far along in the construction process, the renegotiation to a fixed-price was the right thing to do for us at this point in time."

Testimony of Kevin B. Marsh, October 4, 2016, 2016-223-E, Transcript at 135.

(Cross examination by Robert Guild)

"Q: Notwithstanding those commitments by Westinghouse to deliver a substantially fixed-price contract and completion by specific dates, ORS still expressed reservations and concerns that Westinghouse would be able to meet those commitments; isn't that correct?

A: I think they have their concerns. I believe with their meetings on-site, they got themselves comfortable with the contract based on the changes that were made, specifically on the additional liquidated damages that would help cover some of the costs if they were not able to finish the contract on time, and other issues."

Pre-filed Testimony of Allyn Powell, ORS, September 1, 2016, 2016-223-E, Transcript at 727-728.

"…While ORS believes, based on SCE&G's sensitivity study, that the Option on its surface represents a good value given current production and productivity trends, the determination of the Option's true value is based entirely on an analysis of Westinghouse's willingness to abide by the terms of the contract and SCE&G's willingness to hold Westinghouse to those terms….Based on previous experience with this contract and SCE&G's sensitivity study, which at current production and productivity trends shows substantial potential losses to Westinghouse, ORS is concerned that the Option will not truly fix this portion of the cost of the Units. For this reason, in the Settlement ORS insisted that SCE&G agree to stand behind the "fixed price" and provide a guarantee that no additional ratepayer dollars will be requested for items in the scope of the "fixed price" in the Option."

Pre-filed Testimony of Gary Jones, ORS, September 1, 2016, 2016-223-E, Transcript at 908-91.

"In addition, 'fixed price' contracts have generally resulted in reduced participation and influence by the owners of the construction project. The sentiment and approach adopted by the contractor is generally, 'we have guaranteed you the project for this price; leave us alone and we will deliver.' This is not an acceptable approach. ORS regards SCE&G's participation as essential to the satisfactory completion of the Project.

WESTINGHOUSE PRICING/FIXED PRICE OPTION

…
However, since the start of the Project, WEC has not consistently demonstrated its ability to meet contractual commitments. The benefit to the ratepayers from the Option is only as good as WEC's financial ability and willingness to stand behind the EPC Contract. Based on our previous experience in the Project, ORS has little confidence in WEC's assurances that it will be able to deliver on its 'fixed price' commitment."

December 31, 2016 Quarterly Report at 20.

"WEC officials, in a discussion the morning of February 14, 2017, indicated that WEC and its parent guarantor, Toshiba Corporation, are committed to completing Units 2 and 3, with a revised completion schedule of April 2020 and December 2020, respectively; however, the Company will continue to monitor WEC's ability to adhere to the new schedule, as well as the financial condition of WEC and Toshiba and its effect on their ability to complete the project. The total project capital cost is now estimated at approximately $7.7 billion including escalation and allowance for funds used during construction (SCE&G's portion in future dollars)."

9. STORAGE/PREVENTIVE MAINTENANCE

Bechtel Report; 4.1.3, p. 27

Pre-Bechtel Report

Pre-filed Testimony of Ronald Jones, May 26, 2015, 2015-103-E, Transcript at 579-580.

"SCE&G is responsible for the warehouse and storage space for materials and equipment necessary to operate the Units. SCE&G also is required to pay for the office space and related support facilities for its NND team personnel while they are on site. Because of delays in the project schedule, construction teams and operational readiness teams will overlap more, requiring more space. In addition, the maintenance, upkeep and other cost of office space and related support facilities will have to be borne by the project for a longer period of time. SCE&G has taken reasonable steps to reduce the scope and cost of the additional warehouse, storage, office, and other support facilities. Nevertheless, SCE&G forecasts that additional facilities and facilities cost associated with the new Substantial Completion Dates will increase Owner's cost by approximately $6.1 million, or approximately 1% of the total change in the capital cost schedule."

Pre-filed Direct Testimony of Carlette L. Walker, May 26, 2015, 2015-103-E, Transcript at 632.

"Pursuant to the terms of the approved EPC Contract, SCE&G is responsible for the warehouse and storage space for materials and equipment necessary to operate the Units. The Company also is required to pay for the office space and related support facilities for its NND team personnel while they are on site. Because of the delay in the project schedule, it will be necessary for the construction and operational readiness teams to perform certain scopes of work simultaneously. Therefore, additional facilities will be required to provide the teams with sufficient space to complete their respective scopes of work. In addition, the maintenance, upkeep, and other costs of office space and related support facilities will have to be borne by the project for a longer period of time."

September 30, 2015 Quarterly Report at 13.

"Storage of equipment is an issue which the Consortium is addressing in part by securing additional warehouse facilities off-site.

September 30, 2015 Quarterly Report at 19.

"SCE&G continued oversight of on-site storage, preventative maintenance and preservation of components before and after installation. CB&I has recently issued a revised procedure to clarify storage and preservation requirements for all components. SCE&G continues to monitor resolution of CB&I's preventative maintenance (PM) backlog."

Letter from Dukes Scott to SCE&G, January 5, 2016

"Inventory storage and control present one of the major challenges to successful completion of the project. CB&I intends to conduct a complete site inventory and re-verification of the site warehouses and lay-down areas. This effort will assist the project in properly staging equipment and commodities to support ongoing construction activities."

10. MODULE FABRICATION

Multiple Observations in Bechtel Report

Pre-Bechtel Report

March 31, 2014 Quarterly Report at 14.

"[T]he fabrication and delivery of CA20 and CA01 submodules is a critical path items for both Units. Accordingly, production of these modules remains a very important focus area for the project. SCE&G maintains a presence on site at CB&I-LC to monitor activities at CB&I-LC and interact with CB&I-LC leadership on a regular basis."

March 31, 2014 Quarterly Report at 15.

"Delays in setting the CA01 module would likely affect the schedule for setting the CA03 module and therefore the other construction activities that follow the setting of that module. For this reason, SCE&G is monitoring the schedule for completing and setting the CA01 module closely."

March 31, 2014 Quarterly Report at 16.

"CB&I has transferred fabrication for the principal Unit 3 CA20 and CA01 submodules to Oregon Iron Works, and Toshiba/IHI Corporation, respectively. Each of these entities is experienced in modular construction."

March 31, 2014 Quarterly Report at 16.

"Senior management from both SCE&G and WEC/CB&I continue to monitor the fabrication and delivery process related to submodules. WEC personnel continue to provide onsite engineering support for production at CB&I-LC. SCE&G continues to maintain a permanent resident inspector at the CB&I-LC facility who provides additional monitoring. SCE&G will monitor closely the startup processes at Oregon Iron Works and Toshiba/IHI Corporation. The fabrication of the submodules continues to be an important area of focus for the project."

June 30, 2014 Quarterly Report at 13.

"[T]he fabrication and delivery of CA01 submodules is a critical path item for both Units. Accordingly, production of these modules remains a very important focus area for the project. SCE&G maintains a presence on site at CB&I-LC to monitor activities at CB&I-LC and interact with CB&I-LC leadership on a regular basis."

March 31, 2015 Quarterly Report at 15.

MODULE FABRICATION

"After the close of the period, WEC/CB&I made the decision to transfer fabrication of the Unit 3 CA03 modules from the MetalTek-SMCI Division (SMCI) in Lakeland, Florida to CB&I-LC due to production issues at SMCI."

This was repeated in the June 30, 2015 Quarterly Report at 17.

June 30, 2015 Quarterly Report at 16-17.

"Due to production issues at SMCI in Lakeland, Florida, and with input from SCE&G, WEC/CB&I has decided that parts and materials for future Unit 2 CA03 submodules will be shipped from SMCI to the Jenkinsville site in kit form where they will be assembled and welded together by CB&I personnel."

June 30, 2015 Quarterly Report at 24

"WEC/CB&I subcontracted the construction of the steel panels which will form the walls of the Shield Buildings to NNI in Newport News, Virginia. Schedule delay related to the finalization of design of these panels have placed the fabrication of these panels on the critical path for timely completion of the project. CB&I and NNI are in discussions to expand its manufacturing facility to allow for additional panels to be worked in parallel, thus mitigation potential schedule delay."

Letter from Dukes Scott to SCE&G, October 14, 2015

"On September 10, 2015, ORS consultant, Gary Jones, visited Greenberry and Vigor (previously Oregon Iron Works) module-fabrication facilities located near Portland, Oregon. Below are ORS observations and recommendations resulting from Mr. Jones' visit; SCE&G needs to:

- Ensure that the Consortium improves the continuity and performance of their source inspectors assigned to the subject facilities. Turnover of CB&I source inspectors at Greenberry, especially among the leadership, has been high. This turnover has contributed to the delays in module delivery due to re-inspections. Every change in leadership produces new directions and new inspectors restarting the process. In fact, the Westinghouse lead assigned to the area had never visited the Greenberry facilities or offices.

- Pursue changes with the Consortium source-inspection processes and procedures at these facilities and possibly at other module-fabrication facilities. The extent of the required documentation to be submitted as part of the module and sub-module Certificates and Conformance is excessive and unnecessary. CB&I inspectors could perform their inspections and checks earlier in the process, rather than waiting until all the paperwork has been completed by the fabricators. These issues have resulted in unnecessary delivery delays.

- Continue to pursue the release of design-change documentation to the fabricators. Changes have been held by CB&I and not released to the fabricators because of contract

cost-dispute issues between Westinghouse and CB&I. At the time of their meeting, no changes had been released to Greenberry since late March of this year and none had been released to Vigor since early June. The withholding of design-change documentation represents hundreds of changes and has resulted in delays in delivery; it will also result in extensive rework at the site once the modules are received. Subsequent to their meetings, Mr., Jones was advised by SCE&G that action has been taken on this issue and that the changes were being prioritized by CB&I and released to the fabricators for incorporation. However, this momentum needs to continue and detailed monitoring is required."

Letter from Dukes Scott to SCE&G, December 14, 2015

"Delayed structural module fabrication and delivery continue as a critical issue for the Project. Improvements are needed from all subcontractors and the continued role of CB&I - Lake Charles needs immediate attention and resolution."

December 31, 2015 Quarterly Report at 8.

"WEC and NNI have reached agreement on a mitigation plan to accelerate Shield Building panel fabrication. In addition, WEC is de-scoping much of the submodule and mechanical modules work initially assigned to CB&I-LC and CB&I-Island Park including fabrication of the Tension Ring and Air Inlet components of the Shield Buildings. WEC is preparing a revised critical path for the project to reflect current schedule information and mitigation plans. Additional mitigation will be required in critical path areas to bring the current Integrated Construction Plan (ICP) into compliance with the substantial completion dates."

March 31, 2015 Quarterly Report at 12.

"[T]he fabrication and delivery of Shield Building components and structural submodules for the Unit 3 CA01 module are critical path items for the project. Accordingly, production of these components and submodules, and other structural and mechanical modules, remains a very important focus area for the project."

Pre-filed Direct Testimony of Kevin B. Marsh, May 26, 2015, 2015-103-E, Transcript at 88-90 (quoting Combined Application, Docket No. 2008-196-E, Exhibit J, p. 6-12).

"SCE&G's 2008 BLRA application acknowledged that, "[f]or a project of the scope and complexity of the licensing and constructing of the Units, any list of potential risk factors compiled at this stage of the process will not be exhaustive." Petition, Docket No. 2008-196-E, Exhibit J, p. 12. With that caveat, SCE&G listed the specific risks that seemed most important at the time. Among the risks specifically enumerated at that time were many, if not all, of the risks that have resulted in the current update filing:

…

- Module production: "It is possible that manufacturers of unique components (e.g., steam generators and pump assemblies or other large components or modules used in the Units) and manufacturers of other sensitive components may encounter problems

with their manufacturing processes or in meeting quality control standards. . . . Any difficulties that these foundries or other facilities encounter in meeting fabrication schedules or quality standards may cause schedule or price issues for the Units."

Testimony of Kevin B. Marsh, July 21, 2015, 2015-103-E, Transcript at 127.

(Cross examination by Robert Guild)

"Module production goes through a number of phases…The challenge has been in producing those submodules in a way that met the design applications. Many cases, some of the designs changes, as they were building the modules—the submodules, because of constructability concerns. They needed to make sure they were in compliance with all the quality-control assurances that we needed for a nuclear project….The challenge has been in the initial fabrication of those submodules, before they are sent to the site for assembly."

Pre-filed Direct Testimony of Stephen A. Byrne, May 26, 2015, 2015-103-E, Transcript at 255-256.

"Delay in production of modules, submodules and Shield Building panels has been a major source of delay for the project. This remains a key focus area for concern going forward.

However, there are indications that problems in this area are lessening. Three of the six major structural modules for Unit 2 (CA04, CA05, and CA20) have now been fabricated and set in place. The fabrication of a fourth (CA01) is physically complete. All submodules for a fifth (CA02) are on site. Submodules for the sixth module (CA03) are being received. There are one hundred and sixty-seven (167) Shield Building cylinder panels for each Unit. As of May 2015, more than sixty-eight (68) Unit 2 and six (6) Unit 3 Shield Building cylinder panels had been received on site and initial welding of the first ring of them had begun. However, module and submodule production remains a major challenge for the project."

Direct Testimony of Stephen A. Byrne, July 21, 2015, 2015-103-E, Transcript at Transcript 218.

"In our initial BLRA filing in 2008, SCE&G identified uncertainties around the use of modular construction for nuclear units as a potential source of delay. This is a new technique for commercial nuclear builds. Much of the current delay in the substantial completion dates of the units has been caused by delays in fabrication and delivery of submodules for the units.

Beginning in 2010, SCE&G began raising concerns about delays in submodule fabrication. SCE&G worked diligently to convince the consortium to address these issues."

June 30, 2015 Quarterly Report at 2-3.

"It is SCE&G's position that the delay and the majority of the increased costs reflected in the current schedules have been due to WEC/CB&I's failure to meet its contractual obligations related to structural module fabrication, timely design finalization, labor productivity, indirect labor costs and other matters, all despite SCE&G's repeated insistence upon improvements in performance. Accordingly, SCE&G has advised WEC/CB&I that it remains contractually

obligated to satisfy the Guaranteed Substantial Completion Dates previously agreed to in the EPC Contract and other obligations under the EPC Contract, and WEC/CB&I is liable for costs associated with delay and other matters."

September 30, 2015 Quarterly Report at 16.

"In the second quarter of 2015 WEC/CB&I decided that parts and materials for future Unit 2 CA03 submodules will be shipped from SMCI to the Jenkinsville site in kit form where they will be assembled and welded together by CB&I personnel.…The production schedule to date of Unit 3 CA01 and CA20 submodules by Toshiba, IHI Corporation, Oregon Iron Works and CB&I-LC does not support the construction schedule for the Units. WEC/CB&I is formulating plans with these vendors to mitigate these potential schedule delays."

September 30, 2015 Quarterly Report at 17.

"During the period, CB&I stopped production of mechanical modules at the CB&I-Island Park facilities in Beaumont, Texas and transferred production of these modules to CB&I-LC. The reason for doing so was the inadequate rate of production at the Island Park facility. To accelerate production, CB&I-LC continues to fabricate higher-priority Unit 2 mechanical modules on site and to assemble first floor Auxiliary Building mechanical modules there."

December 31, 2015 Quarterly Report at 15.

"During the period, production of mechanical modules at the CB&I-Island Park facilities in Beaumont, Texas was de-scoped and sent back to CB&I-LC. In addition, work on six mechanical modules for Unit 2 and thirteen for Unit 3 were de-scoped from CB&I-LC and the materials and parts are being shipped to Jenkinsville for fabrication on site."

March 31, 2016 Quarterly Report at 12.

"Design changes continue to be communicated by WEC to submodule fabrication vendors on a schedule that disrupts the fabrication process and delays submodule production. This is an area that WEC and Fluor are addressing as a focus area for improving schedule performance and construction efficiency.

WEC is de-scoping much of the submodule and mechanical modules work initially assigned to CB&I-LC and CB&I-Island Park and has authorized NNI to begin engineering and procurement work for the Shield Building Tension Rings and Air Inlets."

March 31, 2016 Quarterly Report at 13.

"The production schedule to date of Unit 3 CA01 submodules by Toshiba and IHI Corporation does not support the construction schedule for the Units. WEC continues to formulate plans with these vendors to mitigate these potential schedule delays. A number of these mitigation plans are focused on shortening transportation time from Japan."

Post-Bechtel Report

MODULE FABRICATION

Letter from Dukes Scott to SCE&G, May 13, 2016

"With regard to construction progress on the project:

Positives

a. SCE&G completed the concrete fill within the walls of the Unit 2 CA20 structural module on April 5. As the first concrete fill of a major structural module on the site, completion of this item is a significant accomplishment.

b. All 17 submodules on Unit 2 CA03 are now standing upright on the plenum in the fabrication tent on site, and final welding and outfitting of the module are underway. The module is on schedule for its placement in the containment vessel in June.

c. Newport News Industrial has made good strides in meeting their most recent schedules for delivery of Shield Building (SB) panels, and the erection of Course 4 of the SB panels has been completed at the construction site.

d. Progress has been made on the on-site fabrication of the Unit 3 CA20 module, subassemblies 1 & 2, in the Module Assembly Building (MAB) that supports a July 2016 placement date. All 72 submodules for this module have been delivered to the site, and subassemblies 3 & 4 have already been placed in the Unit 3 Auxiliary Building.

e. Progress was evident in the MAB on the Unit 3 CA0l module. Six submodules were erected on the plenum in a single week in April, which represents the highest production yet on this activity.

f. Unit 3 Containment Vessel (CV) Ring # 1 installation was completed on April 13.

Concerns

. . . .

m. Mechanical module delivery continues to fall behind schedule. As a result, SCE&G and WECTEC are considering moving fabrication to the site. While this may improve quality and better support construction, it will increase the demands on craft labor on site, and may increase project costs."

June 30, 2016 Quarterly Report at 11.

"The last of the submodules required to fabricate the Unit 3 Module CA01 arrived on site during the period. As a result, fabrication of structural modules and submodules is no longer on the project's primary critical path."

MODULE FABRICATION

Letter from Dukes Scott to SCE&G, June 30, 2016

"Module fabrication and delivery continue to drive the critical paths for the project; however, the focus is gradually shifting from structural modules to mechanical modules and structural steel modules in the Nuclear Island. In addition, the transition areas at the Shield Building to Auxiliary Building roof and the air inlet/tension ring areas of the upper Shield Building are becoming increasingly important. Contracts need to be finalized, and fabrication releases need to be expeditiously forthcoming in order to avoid schedule impacts. As it is, because these contracts have taken so long to be finalized, these items will be on a very tight schedule with little margin."

Letter from Dukes Scott to SCE&G, July 12, 2016, incorporating SCE&G's Responses to June 30, 2016 Letter

"SCE&G asserts that modules, including fabrication and delivery, is a top five focus area for the project. In addition, SCE&G asserts that it maintains its on-site presence at key module vendors, has recently increased oversight efforts, and is working daily with Westinghouse personnel to align priorities, reporting, and mitigations. According to SCE&G, Westinghouse has given suppliers advance authorization to fabricate the Shield Building roof steel and Air Inlet/Tension Ring panels. Westinghouse is also reporting weekly to SCE&G on contract finalization for upcoming scopes of work and has increased authority levels for more than 30 engineers to resolve issues to improve supplier response times. Finally, Westinghouse has moved the responsibility for structural steel procurement from the commodity delivery organization to the module organization to aid this procurement.

…

SCE&G replies that it is currently performing an assessment of installation of components on the CA03 module to identify efficiency gaps and will communicate improvement opportunities to Westinghouse and Fluor."

MODULE FABRICATION

Testimony of Kevin B. Marsh, October 4, 2016, 2016-223-E, Transcript at 100-101.

(Cross examination by Sandra Wright)

"Q: Okay. All right. So now we have a consortium of two?

A: That's correct."

Q: CB&I and Westinghouse. And Westinghouse and CB&I are having problems. But we're having problems, too; SCE&G is having problems at the site. We're having problems with major errors happening, construction errors. Is that correct?

A: There were a number of issues that caused issues in the plant construction. The largest one was probably the manufacture or the fabrication of the submodules which were being done by CB&I at their plant site in Lake Charles, trying to make sure they met the quality control standards that we expected for the work to go into the nuclear plants . . . ."

Testimony of Kevin B. Marsh, October 4, 2016, 2016-223-E, Transcript at 196.

(Cross examination by Commissioner Fleming, addressing construction of shield building)

"A: Well, we encouraged CB&I at the time to have more than one site to fabricate parts and pieces for these plants, especially submodules and some of the major components that go along with the submodules. They now have, I believe it's five different locations where we are fabricating parts. Newport News, in Virginia, is doing the majority of the shield building parts for the first new unit. We have people on-site supervising activities up there. We visit on a regular basis. We stay close, to find out if there are any issues coming up. I know, in talking with Westinghouse and Fluor when they assumed responsibility for the project, they recognized that as one of the areas they needed to focus attention and I know Westinghouse has put additional money and effort and resources into making sure Newport News has what it needs to complete those shield building panels."

Testimony of Stephen A. Byrne, October 12, 2016, 2016-223-E, Transcript at 524.

(Cross examination by Sandra Wright)

"A: …Originally, the premise, from starting with the Shaw Group, was that they were going to do all of the big modules at one place. That was something that we pushed them to change as soon as they started that project. They were loath to change that. Chicago Bridge & Iron, when they took over, they saw the single facility bottleneck as a problem and started to finally diversify the supply chain.

So, as opposed to relying on a facility that's called CB&I Lake Charles, in Lake Charles, Louisiana, for all the big modules and a number of mechanical modules, we now have moved those to different fabricators around the country, and we're getting better quality and more timely deliveries. "

MODULE FABRICATION

Testimony of Stephen A. Byrne, October 12, 2016, 2016-223-E, Transcript at 635-636.

(Cross examination by Commissioner Howard)

"Q: …Please update us on the commercial issues relating to the mechanical modules produced by CB&I at the Lake Charles facility. Where is the module? Is it on-site, or have you disassembled it to be repaired?

A: There are a variety of different types of modules. …We did get some [mechanical modules] in that didn't meet our quality standards. We did have to do some rework of those. In the rework arena, it could be anything from a couple of welds needing to be touched up to, you know, this is deficient and we might as well start from the rails. So we're doing that largely on-site now. We do have inspectors in some of the facilities to let us know what's going on in the facilities. And then we've, again, diversified the supply chain…

So the diversification of that supply chain is largely complete. The commercial disputes have been resolved…."

Letter from Dukes Scott to SCE&G, August 8, 2016

"Construction progress was significantly more visible during this visit than last month. The Unit 2 CA03 module has been set inside of containment. This involved a complicated lift with the Heavy Lift Derrick (HLD) and very precise module placement. The overall setting of the module appears to have been well executed and the lessons learned from both China and Vogtle appear to have been incorporated appropriately. It was disappointing, however, that the scheduled date for this module set slipped several times. This leaves the CA02 module as the remaining major structural module to be installed in Unit 2. In addition, visible progress was seen in the Unit 2 Annex Building and the Unit 2 Turbine Building. The installation of structural steel in the top section of the Turbine Building also has progressed well.

. . . .

It was concerning to learn that the fabrication of the sub-modules for the Unit 3 CA03 module will remain with CB&I-Lake Charles. Although the logic (material availability, primarily) for this decision appears to be sound, the past performance of CB&I-LC with respect to producing modules on schedule and with the appropriate paperwork is concerning."

September 30, 2016 Quarterly Report at 7.

"The fabrication of Shield Building components and structural submodules for Unit 3 Module CA01 is a potential critical path item for the project. Additional mitigation will be required in certain of these critical path areas to support the substantial completion dates described below."

September 30, 2016 Quarterly Report at 10.

"The on-site assembly of structural modules remains a potential critical path item for the project as does the quality and fabrication schedule of mechanical modules."

MODULE FABRICATION

September 30, 2016 Quarterly Report at 10.

"Commercial issues between WEC and CB&I related to mechanical modules produced by CB&I-LC remain unresolved and are impacting mechanical module production schedule. During the period, WEC implemented contingency purchase orders for the mechanical modules CB&I-LC had been supplying. Other vendors now will be supplying these modules. WEC continues schedule mitigation planning related to these modules and issuing purchase orders to other vendors. Production of these modules, and other structural and mechanical modules, remains an important focus area for the project."

September 30, 2016 Quarterly Report at 10-11.

"One hundred twenty-seven (127) of the 167 Shield Building Panels for the Unit 2 Shield Building have been received on site from NNI. Seventy-three (73) of the Unit 3 Shield Building panels are on site. NNI continues to meet quality and schedule expectations. NNI is actively implementing its mitigation plan to accelerate shield building panel fabrication."

September 30, 2016 Quarterly Report at 11.

"During the period, NNI issued a schedule for fabricating the Unit 2 and Unit 3 Air Inlet and Tension Rings. This schedule meets construction need dates for these components."